IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

BLUESTONE INNOVATIONS LLC,

Plaintiff,

v.

NICHIA CORPORATION; NICHIA AMERICA CORPORATION,

Defendants.
_____/

No. C 12-00059 SI

CLAIM CONSTRUCTION ORDER

BLUESTONE INNOVATIONS LLC.

Plaintiff

v.

VIZIO, INC.,

Defendant,
_____/

No. C 13-01770 SI

On June 4, 2014, the Court held a *Markman* hearing regarding the construction of disputed claim terms in U.S. Patent No. 6,163,557 owned by the plaintiff. Having considered the arguments of counsel and the papers submitted, the Court construes the disputed claim terms as follows.

BACKGROUND

The present matter involves two related patent infringement actions initiated by plaintiff Bluestone Innovations LLC against defendants Nichia Corporation, Nichia America Corporation, and

VIZIO, Inc., pertaining to U.S. Patent No. 6,163,557 ("the '557 patent"). By the present claim construction briefs, the parties request that the Court construe seven disputed terms from the '557 patent.

The invention described in the '557 patent is directed at reducing cracks in optoelectronic devices—light-emitting diodes ("LEDs") and laser diodes ("LDs")—that utilize III-V nitride[1] epitaxial films grown on substrates. *See* '557 Patent at 3:42-46. The patent notes that III-V nitride films—specifically, Galium Nitride ("GaN") and Galium Aluminum Nitride ("AlGaN") epitaxial films—have been grown on sapphire substrates for optoelectronic applications. *Id.* at 1:37-38. The patent explains that III-V nitrides have many advantages, particularly when the aluminum percentage in the cladding layers is increased, but also explains that these epitaxial films suffer from a cracking problem. *See id.* at 1:13-56. The '557 patent states that this cracking problem is possibly caused by (1) "thermal expansion mismatch between the epitaxial films and the sapphire substrate which places the films in tension" and (2) "alloy hardening due to increased aluminum concentration[, which] may promote film cracking during cooldown from the film growth temperature of about 1000° C. to room temperature." *Id.* at 2:1-7.

The '557 patent attempts to solve or ameliorate this cracking problem by utilizing a structure that is comprised of a substrate with at least one upstanding mesa having a top surface. '557 Patent at 2:19-21. The '557 patent explains that "[t]he top surfaces [of the mesas] provide reduced area surfaces for growing the III-V nitride films. The reduced area surfaces reduce thermal stresses in the films." *Id.* at 2:22-25; *see id.* at 2:38-39 ("The top surfaces of the mesas are dimensioned to reduce stress and associated cracking in the films."). In addition, the '557 Patent explains that "the substrates and the III-V nitrides films have an epitaxial relationship that reduces cracking in the films. For example, . . . [t]he mesas can be oriented such that surfaces of the mesas are oriented along crack planes of the films, such as the m-planes of GaN or AlGaN films." *Id.* at 2:31-37.

Plaintiff accuses defendants of infringing claims 1, 9, and 23 of the '557 patent. Docket No. 362

[1] "The III-V nitrides comprise group III and V elements of the periodic table. The III-V nitrides can be binary compounds, as well as ternary and quarternary alloys." '557 Patent at 3:50-52.

at 1.[2] These claims are as follows:

> **1.** A structure comprising:
>
> a substrate including at least one upstanding mesa, each mesa having a top surface; and
>
> a group III-V nitride epitaxial film on the top surface of at least one mesa;
>
> wherein the at least one mesa including [*sic*-includes] surfaces oriented along crack planes of the epitaxial film.
>
> **9.** The structure of claim **1**, wherein the at least one mesa comprises a plurality of mesas spaced from each other by a distance of less than about 50 microns.
>
> **23.** A method of forming a structure, comprising:
>
> providing a substrate; and
>
> patterning the substrate to form at least one mesa, each mesa including a top surface;
>
> epitaxially growing a group III-V nitride epitaxial film on the top surface of at least one mesa[, where] the at least one mesa including [*sic*-includes] surfaces oriented along crack planes of the epitaxial film.

LEGAL STANDARD

Claim construction is a matter of law. *Markman v. Westview Instr., Inc.*, 517 U.S. 370, 372 (1996). Terms contained in claims are "generally given their ordinary and customary meaning." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1312. In determining the proper construction of a claim, a court begins with the intrinsic evidence of record, consisting of the claim language, the patent specification, and, if in evidence, the prosecution history. *Id.* at 1313; *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). "The appropriate starting point . . . is always with the language of the asserted claim itself." *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998); *see also Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997).

[2] Citations to the record in this order will be to the documents filed in *Bluestone Innovations LLC v. Nichia Corp.*, No. 12-cv-59.

Accordingly, although claims speak to those skilled in the art, claim terms are construed in light of their ordinary and accustomed meaning, unless examination of the specification, prosecution history, and other claims indicates that the inventor intended otherwise. *See Electro Medical Systems, S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1053 (Fed. Cir. 1994). While claims are interpreted in light of the specification, this "does not mean that everything expressed in the specification must be read into all the claims." *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 957 (Fed. Cir. 1983). For instance, limitations from a preferred embodiment described in the specification generally should not be read into the claim language. *See Comark*, 156 F.3d at 1187. However, it is a fundamental rule that "claims must be construed so as to be consistent with the specification." *Phillips*, 415 F.3d at 1316. Therefore, if the specification reveals an intentional disclaimer or disavowal of claim scope, the claims must be read consistently with that limitation. *Id.*

Finally, the Court may consider the prosecution history of the patent, if in evidence. *Markman*, 52 F.3d at 980. The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution. *See Southwall Technologies, Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995). In most situations, analysis of this intrinsic evidence alone will resolve claim construction disputes. *See Vitronics*, 90 F.3d at 1583. Courts should not rely on extrinsic evidence in claim construction to contradict the meaning of claims discernable from examination of the claims, the written description, and the prosecution history. *See Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1308 (Fed. Cir. 1999) (citing *Vitronics*, 90 F.3d at 1583). However, it is entirely appropriate "for a court to consult trustworthy extrinsic evidence to ensure that the claim construction it is tending to from the patent file is not inconsistent with clearly expressed, plainly apposite, and widely held understandings in the pertinent technical field." *Id.* Extrinsic evidence "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317. All extrinsic evidence should be evaluated in light of the intrinsic evidence. *Id.* at 1319.

DISCUSSION

I. *mesa*

Plaintiff	Defendants
"projection"	"an elevated formation with a flat top and steep or vertical sidewalls"

The parties appear to agree that a mesa must be an elevated formation. The parties' dispute with respect to this term centers around whether the elevated formation must have a flat top and steep sidewalls.

There is no language in the claims themselves requiring that the mesas possess a flat top. Defendants argue that a mesa must have a flat top because every figure or description of mesa structures in the '557 patent's specification shows a flat top. Docket No. 365 at 8-9. Here, defendants rely on descriptions of preferred embodiments contained in the specification. But, "'it is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.'" *DealerTrack, Inc. v. Huber*, 674 F.3d 1315, 1327 (Fed. Cir. 2012). Here, the specification does not contain language clearly indicating that mesas are limited to formations with a flat top. To the contrary, the specification states that the mesas can have "various shapes." *See id.* at 5:55. Moreover, the specification states: "[t]he mesas are typically polygonal shaped. For example, the mesas can be rhombohedral or rectangular shaped." '557 Patent at 2:26-27. This language implies that the mesas can be non-polygonal shaped. *See also id.* at 5:55 ("The mesas 10 and 110 can have various shapes."). A polygon is "a closed plane figure bounded by straight lines," for example a triangle, a rectangle, or a trapezoid. MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY 962 (11th ed. 2003). Thus, the specification states that the surfaces of the mesas are typically bounded by straight lines, but also allows them to be bounded by non-straight lines, i.e., curved lines.[3] Because the specification

[3] The specification refers to the shape of the mesas. This evidently refers to the entire three-dimensional shape of the mesas, not just a particular surface, since the specification uses the term "rhombohedral" shaped. *See* '557 Patent at 2:17, 5:56. The term "rhombohedral" refers to a three-dimensional object. *See* WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1949 (2002) (defining

recognizes that the surfaces of the mesas can be bounded by curved lines, the language in the specification does not require that mesas possess a flat top. In arguing that the mesas must possess flat tops, defendants also rely on dictionary definitions of the term "mesa" and how the term is used in geology. Docket No. 365 at 8, 10. However, extrinsic evidence cannot be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the intrinsic record. *Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 977-78 (Fed. Cir. 2014); *Bell Atl. Network Servs. v. Covad Commc'ns Grp.*, 262 F.3d 1258, 1269 (Fed. Cir. 2001). The specification implies that the surfaces of the mesas do not have to be bounded by straight lines. Therefore, defendants cannot rely on extrinsic evidence to contradict this definition. Accordingly, the Court declines to adopt a construction of the term "mesa" that requires that the mesa possess a flat top.[4]

Turning to defendants' contention that the mesas must have steep or vertical sidewalls, there is no language in the claims themselves requiring that the mesas possess steep or vertical sidewalls. Independent claims 1 and 23 require that each mesa possess a top surface. '557 Patent at 8:64-65, 10:21. The claims also require that each mesa have multiple surfaces oriented along crack planes. *Id.* at 9:1-2, 10:25. As such, the claims require that each mesa must have at least a top surface and some other side surface or surfaces. *See also id.* at 2:28-30. However, the claims do not mandate that these side surfaces be steep or vertical. In support of their argument that the side surfaces of the mesas must be steep or vertical, defendants again rely on descriptions of preferred embodiments in the specification and extrinsic dictionary definitions. Docket No. 365 at 9-12. But, the language in the specification identified by defendants does not clearly indicate that the patentees intended for mesas to be limited to formations with steep or vertical sidewalls. To the contrary, the specification states that the mesas can have various shapes. *See id.* at 2:27-30, 5:55. Accordingly, the Court declines to adopt a construction requiring that the side surfaces be steep or vertical. In conclusion, the Court construes "mesa" as "an

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"rhombohedral" as "relating to or having the form of a rhombohedron or a form derivable from a rhombohedron" and defining "rhombohedron" as "a parallelepiped whose faces are six rhombuses").

[4] Defendants also argue that a mesa must have a flat top for depositing the epitaxial film. Docket No. 365 at 9. But, defendants do not explain why the epitaxial film could not be deposited on a curved top surface.

elevated formation with a top surface and side surfaces."[5]

II. *upstanding mesa*

Plaintiff	Defendants
"upright projection"	"a mesa with vertical sidewalls perpendicular to the substrate"

Defendants contend that the term "upstanding" modifies the term "mesa" to require that the mesa possess vertical sidewalls perpendicular to the substrate. Docket No. 365 at 12-14. Defendants' proposed construction has no support in the intrinsic record. Defendants identify instances in the specification where the patent refers to an upstanding mesa. *Id.* at 13 (citing '557 Patent at 2:20-21, 4:26-29). But, the portions of the specification cited by defendants make no reference to the mesa possessing vertical sidewalls perpendicular to the substrate. Defendants also attempt to rely on figure 1 of the patent. They argue that figure 1 clearly shows a mesa with vertical sidewalls perpendicular to the substrate. *Id.* However, this does not appear to be correct. The specification states that the mesas in figure 1 contain a rhombohedral shape. '557 Patent at 5:55-56; *see also id.* at 2:28 ("the mesas can be rhombohedral or rectangular shaped"). A rhombohedron is a three-dimensional object whose faces are six rhombuses. WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1949 (2002) (defining "rhombohedral" as "relating to or having the form of a rhombohedron or a form derivable from a rhombohedron" and defining "rhombohedron" as "a parallelepiped whose faces are six rhombuses") Because the surfaces of a rhombohedron are shaped like rhombuses rather than squares or rectangles, the sidewalls can be at an angle rather than perpendicular to the substrate. Therefore, figure 1 contradicts rather then supports defendants' proposed construction. Moreover, the fact that the specification discloses that the mesas can be rhombohedron shaped means that defendants' proposed construction would exclude preferred embodiments of the invention. "[A] construction that excludes a preferred embodiment 'is rarely, if ever, correct and would require highly persuasive evidentiary support.'" *Starhome GmbH v. AT&T Mobility LLC*, 743 F.3d 849, 857 (Fed. Cir. 2014). Accordingly,

[5] At the hearing, plaintiff stated that "an elevated formation with a top surface and side surfaces" was a permissible construction for this claim term.

the Court declines to adopt a construction of this term that requires that the mesas possess vertical sidewalls perpendicular to the substrate.

Plaintiff's proposed construction gives the term "upstanding" the plain and ordinary meaning the term would have as it is understood by a lay person—that the mesa is upright to the substrate rather than on its side, upside down, inverted or in some other direction. *See Phillips*, 415 F.3d at 1314 ("In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words."). Moreover, although the language in the claims and the specification do not provide guidance on what is meant by the term "upstanding," plaintiff's proposed construction is supported by the prosecution history. During the prosecution history, the examiner stated: "In the instant case the structure as claimed can be fabricated on a mesa which is not upstanding, i.e., at an angle other than normal to the substrate." Docket No. 365-4. Egan Decl. Ex. C at 059. Here, the examiner defined a non-upstanding mesa as a mesa that is at an angle other than normal to the substrate, meaning that an upstanding mesa is a mesa that is normal, i.e, perpendicular, to the substrate. *See* WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1540 (2002) (defining "normal" as "forming a right angle: perpendicular"). "Perpendicular" is synonymous with "upright."[6] *Id.* at 1684 (defining "perpendicular" as "exactly vertical or upright"). Accordingly, the Court construes "upstanding mesa" as "a perpendicular mesa."[7]

III. *a top surface*

Plaintiff	**Defendants**
"uppermost 2-dimensional locus of points"	"the flat top of a mesa providing a reduced growth area dimensioned such that it reduces stress and associated cracking of the epitaxial film"

[6] Defendants also attempt to rely on this statement by the examiner to support their proposed construction. Docket No. 365 at 13. But, the statement does not support their construction because the statement requires that the mesa, not the sidewalls, be normal, i.e., perpendicular, to the substrate.

[7] At the hearing, plaintiff stated that it was permissible to use the word "perpendicular" rather than the word "upstanding" in the construction for this term.

Defendants' proposed construction requires that the mesas possess flat tops. As explained previously, the '557 patent does not require that the top surfaces of the mesas be flat. *See supra* section I. Therefore, the Court rejects defendants' proposed construction to the extent it requires that the top surfaces be flat.

The remainder of defendants' proposed construction requires that the top surface provide a reduced growth area dimensioned such that it reduces stress and associated cracking of the epitaxial film. This portion of defendants' proposed construction has support in the intrinsic record. In describing the invention, the specification states: "The top surfaces provide reduced area surfaces for growing the III-V nitride films. The reduced area surfaces reduce thermal stresses in the films." '557 Patent at 2:22-25. The specification further states: "The top surfaces are dimensioned to reduce stress and associated cracking in the films." *Id.* at 2:38-39. Here, the specification is not merely describing preferred embodiments, but is explaining how the top surface allows the invention to function properly. Indeed, the specification teaches that the primary problem sought to be solved by the invention was cracking in the epitaxial film. *Id.* at 1:50-2:15. The '557 patent attempts to alleviate this cracking problem by having the top surface function in the above manner. "In construing claims, the problem the inventor was attempting to solve, as discerned from the specification and the prosecution history, is a relevant consideration." *CVI/Beta Ventures v. Tura LP*, 112 F.3d 1146, 1160 (Fed. Cir. 1997); *see also GE Lighting Solutions, LLC v. AgiLight, Inc.*, No. 2013-1267, 2014 U.S. App. LEXIS 8202, at *8 (Fed. Cir. May 1, 2014) ("[W]e have used disclaimer to limit a claim element to a feature of the preferred embodiment when the specification described that feature as a 'very important feature . . . in an aspect of the present invention,' and disparaged alternatives to that feature."); *LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 424 F.3d 1336, 1343-44 (Fed. Cir. 2005) ("While it is true that not every advantage of the invention must appear in every claim, it would be peculiar for the claims to cover prior art that suffers from precisely the same problems that the specification focuses on solving." (citation omitted)). Accordingly, the Court concludes that it is appropriate to add this functional language to the construction of this term.

Plaintiff argues that it is improper to add extraneous functional limitations to the construction

of a claim term. Docket No. 362 at 16. However, "[t]he use of comparative and functional language to construe and explain a claim term is not improper. A description of what a component does may add clarity and understanding to the meaning and scope of the claim. The criterion is whether the explanation aids the court and the jury in understanding the term as it is used in the claimed invention." *Funai Elec. Co., Ltd. v. Daewoo Elecs. Corp.*, 616 F.3d 1357, 1366 (Fed. Cir. 2010); *accord ICU Med., Inc. v. Alaris Med. Sys.*, 558 F.3d 1368, 1375-76 (Fed Cir. 2009) ("[I]t is 'entirely proper to consider the functions of an invention in seeking to determine the meaning of particular claim language.'"). Here, the functional language proposed by defendants adds clarity to the meaning and scope of the claims and would assist the jury in distinguishing the top surface of the mesa from the mesa's other surfaces. Accordingly, the Court construes "a top surface" as "the uppermost surface of a mesa providing a reduced growth area dimensioned such that it reduces stress and associated cracking of the epitaxial film."[8]

IV. *film on the top surface of at least one mesa*

Plaintiff	**Defendants**
"film deposited on the top surface of at least one mesa"	"film grown on the reduced growth area of at least one mesa wherein the film edges are proximate to the edges of the top surface of each such mesa"

The parties agree that this term at a minimum requires that the film is deposited or grown on the top surface of the at least one mesa.[9] The parties dispute whether this term requires that the film edges be proximate to the edges of the top surface of the at least one mesa.

There is no language in the asserted claims themselves requiring that the film edges be proximate to the edges of the top surface. To support their construction, defendants rely on language in the

[8] Plaintiff proposes construing this term as the "uppermost 2-dimensional locus of points." Docket No. 362 at 14. Although the Court finds that this is an appropriate description of the structure of the top surface, the Court concludes that this particular description might be confusing to the jury, and it would be better to simply describe the top surface as the uppermost surface of the mesa.

[9] The parties agree that the '557 patent uses the terms "deposited" and "grown" interchangeably. *See* Docket No. 362 at 17; Docket No. 365 at 18; *see, e.g.*, '557 Patent at 8:44-47.

specification describing preferred embodiments. Docket No. 365 at 17-18 (citing '557 Patent at 4:67-5:7, 8:45-53, fig. 5). "'[I]t is improper to read limitations from a preferred embodiment described in the specification . . . into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.'" *DealerTrack*, 674 F.3d at 1327. The language cited by defendants does not provide a clear indication that the patentees intended for the invention to require that the film edges be proximate to the edges of the top surface. *See* '557 Patent at 8:46-47 (stating that "GaN films can be grown with free sidewalls", not that they must be grown with free sidewalls). Moreover, defendants' proposed construction would exclude a preferred embodiment disclosed in the patent. Figure 6 of the patent displays an embodiment where the film edges are not proximate to the edges of the top surface of the mesa.[10] *See* '557 Patent at 8:14-24, fig. 6. "[A] construction that excludes a preferred embodiment 'is rarely, if ever, correct and would require highly persuasive evidentiary support.'" *Starhome*, 743 F.3d at 857. Defendants have failed to provide the Court with such highly persuasive evidentiary support for their proposed construction. Accordingly, the Court adopts plaintiff's proposed construction and construes "film on the top surface of at least one mesa" as "film deposited on the top surface of at least one mesa."

V. *crack planes of the epitaxial film*

Plaintiff	**Defendants**
"preferential cleavage planes of the epitaxial film"	"planes on which the epitaxial film would most likely crack during the growth process, which are the m-planes of the hexagonal gallium nitride and aluminum gallium nitride crystals"

The parties dispute only the latter part of defendants' proposed construction. Plaintiff states in

[10] Defendants argue that their proposed construction is consistent with figure 6 because certain surfaces of the film displayed in figure 6 other than the terminal edges should also be considered film edges. Docket No. 365 at 19. The Court disagrees. Moreover, if it is defendants' contention that these surfaces can also qualify as film edges, then defendants have not provided a sufficient description of what they mean by the term "film edges" in their proposed construction.

its brief that the first portion of defendants' proposed construction defining the term as "planes on which the epitaxial film would most likely crack during the growth process" is an acceptable alternative construction for the term. Docket No. 362 at 18. Therefore, because plaintiff states that this would be an acceptable construction, and the Court finds that this portion of defendants' proposed construction would be more easily understood by a jury than plaintiff's proposed construction, the Court's construction will include the first part of defendants' proposed construction.

Turning to the latter part of defendants' proposed construction, the Court first notes that defendants' proposed construction appears to limit "crack planes" to being only the m-planes of Hexagonal Gallium Nitride and Aluminum Galluim Nitride Crystals. This construction would improperly require that the epitaxial film claimed by the patent be limited to Hexagonal Gallium Nitride and Aluminum Galluim Nitride Crystals, contradicting the claim language of the '557 patent which merely requires that the epitaxial film be comprised of a group III-V nitride. *See* '557 Patent at 8:66, 10:23. In their brief, defendants explain that they are not attempting to limit the asserted claims to require that the epitaxial film be composed of only Hexagonal Gallium Nitride or Aluminum Galluim Nitride. Docket No. 365 at 24. They explain that the accused products in this case employ GaN and/or AlGaN epitaxial layers, and, therefore, they seek clarification on whether the '557 patent requires that the crack planes for these two specific types of film be the m-planes. Because the parties dispute whether the patent requires that the crack planes for GaN and AlGaN film be the m-planes, it is the Court's duty to resolve the dispute. *See O2 Micro*, 521 F.3d at 1362 ("When the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it.").

When describing the cracking problem that the invention aimed to remedy, the specification states: "[m]icroscopic analysis has revealed that the spacing of these cracks is about 10 µm along the $\{10\bar{1}0\}$ prism planes of the GaN and AlGaN films." '557 Patent at 1:59-61; *see CVI/Beta Ventures*, 112 F.3d at 1160 ("In construing claims, the problem the inventor was attempting to solve, as discerned from the specification and the prosecution history, is a relevant consideration."). The specification later explains that $\{10\bar{1}0\}$ planes are m-planes. *See id.* at 4:44, 4:54. Further, the specification states in describing the invention: "The mesas can be oriented such that surfaces of the mesas are oriented along crack planes of the films, such as the m-planes of GaN or AlGaN films." *Id.* at 2:34-37; *see also id.* at

2:51-54 ("For GaN and AlGaN films, mesas for edge emitting devices having widths less than about 10 microns can significantly reduce or eliminate cracking along m-planes in the film."). Here, the specification provides the m-planes of GaN or AlGaN films as an example of crack planes. The specification when describing preferred embodiments goes on to list the different types of planes that a crystal can have, such as a-planes, c-planes, m-planes, and r-planes.[11] *See id.* at 4:31-47. The specification then states:

> As explained, GaN and AlGaN epitaxial films grown on sapphire substrates according to known processes are subject to crack formation in the epitaxial films . . . . These cracks have a spacing of about 10 microns along the . . . m-planes 91 of the GaN and AlGaN films. Referring to FIG. 3, the cracks occur along opposed m-planes in the GaN films, such as the m-planes 91 and 94, having a spacing of about 10 microns. Cracks can also occur along the other m-planes 92, 93, 95 and 96. . . . The cracks also occur at about the same spacing along m-planes in AlGaN films.

Id. at 4:49-61. The Court recognizes that "'it is improper to read limitations from a preferred embodiment described in the specification . . . into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.'" *DealerTrack*, 674 F.3d at 1327. However, here the language in the specification provides a clear indication that, with respect to GaN and AlGaN films grown on sapphire substrates, the patentees intended to limit the crack planes to the m-planes and not some other types of planes. In addition, during plaintiff's portion of its technical tutorial presentation, Ms. Romano, a named inventor of the '557 patent, testified that the planes on which the epitaxial films are most likely to crack are the m-planes. Accordingly, the Court adopts defendants' proposed construction, but will change the language slightly to clarify that the claims are not limited to only GaN or AlGaN epitaxial films grown on sapphire substrates. The Court construes the term "crack planes of the epitaxial film" as "planes on which the epitaxial film would most likely crack during the growth process, for example for GaN or AlGaN films grown on a sapphire substrate this would be the m-planes."[12]

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[11] Plaintiff argues that crack planes can also include a-planes, c-planes, r-planes, and other planes. Docket No. 362 at 18. However, neither the claims nor the specification ever refer to these types of planes as crack planes.

[12] Plaintiff also argues that defendants' proposed construction violates the principle of claim differentiation because dependent claim 2 more specifically claims that "each mesa further includes side surfaces and end surfaces oriented along m-planes of the GaN epitaxial film." Docket No. 368 at 10-11

VI. *the at least one mesa including [sic-includes] surfaces oriented along crack planes*

Plaintiff	Defendants
"the at least one mesa including at least two 2-dimensional loci of points aligned with preferential cleavage planes"	"each such mesa includes at least two flat sidewalls each parallel to a crack plane"

Defendants' proposed construction for this term requires that the mesas possess flat sidewalls. But, as explained while construing the term "mesa," the '557 patent does not require that the surfaces of the mesas be flat. *See supra* section I; '557 Patent at 2:26. Defendants' proposed construction also requires that it is the sidewalls that must be oriented along the crack planes. But, the claim language simply requires that the mesas have "surfaces" oriented along the crack planes. '557 Patent at 9:1-2. There is no claim language requiring that these surfaces be only the side surfaces. To support their contention that they must be sidewalls, defendants only rely on descriptions of preferred embodiments contained in the specification. The Court declines to import these limitations from preferred embodiments into the claims. *See DealerTrack*, 674 F.3d at 1327.

Next, plaintiff argues that defendants' use of the word "parallel" in their construction is improper because all that is required by the claim is that the surface be "oriented" to the crack planes. Docket No. 362 at 21. Plaintiff argues that the word "oriented" should be given its plain and ordinary meaning, which is "to align or position with respect to a point or system of reference."[13] *Id*. However, the '557 patent uses the terms "oriented along," "oriented parallel," "parallel," and "aligned" interchangeably. *See, e.g.*, '557 Patent at 2:34-37, 4:42-45, 4:64-67, 5:17-25, 5:37-45, 5:58-59. Moreover, even accepting

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(quoting '557 Patent at 9:10-11). "Under the doctrine of claim differentiation, dependent claims are presumed to be of narrower scope than the independent claims from which they depend." *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1242 (Fed. Cir. 2003); *see also Alcon Research, Ltd. v. Apotex Inc.*, 687 F.3d 1362, 1367 (Fed. Cir. 2012) ("It is axiomatic that a dependent claim cannot be broader than the claim from which it depends."). "The doctrine of claim differentiation stems from 'the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.'" *Seachange Int'l, Inc. v. C-COR Inc.*, 413 F.3d 1361, 1368 (Fed. Cir. 2005). However, under the Court's adopted construction, claim 1 remains broader and different in scope than claim 2. Claim 2 requires that the side and end surfaces be oriented only along the m-planes of the GaN film. Under the Court's construction, claim 1 allows any two surfaces to be oriented not only along the m-planes of the GaN film, but also allows them to be oriented along the m-planes of AlGaN film or along the appropriate crack planes of any other type of III-V nitride film.

[13] Plaintiff notes that none of the dictionaries cited by the defendants define the word "orient" as "parallel." Docket No. 362 at 21.

plaintiff's definition for the word "oriented," the claims and the specification do not simply use the word "oriented." They use the phrase "oriented along." '557 Patent at 2:42, 9:1, 10:25. "Along" means "in a line parallel with the length or direction of." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 60 (2002); *see also* MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY 34 (11th ed. 2003) (defining "along" as "in a line matching the length or direction of"). Therefore, if a surface is "oriented along" a plane, it is aligned or positioned parallel to the plane. Accordingly, the Court's construction will include the word "parallel."

Finally, defendants' proposed construction requires that each surface is parallel to only one crack plane. Docket No. 365 at 20-21. But, the plain language of independent claims 1 and 23 uses the term "crack planes" not "a crack plane." '557 Patent at 9:2, 10:25. In addition, it appears from the specification that it is impossible for a surface to be parallel to only one crack plane. As displayed in figure 3, a hexagonal crystal has six m-planes with each m-plane being parallel to an opposing m-plane. *See* '557 Patent fig. 3. For example, m-plane 91 is parallel to m-plane 94. *Id.* Therefore, if a surface is parallel to m-plane 91 it would also have to be parallel to a second m-plane, m-plane 94. Accordingly, the Court declines to adopt a construction requiring that each surface be parallel to only one crack plane. In conclusion, the Court construes "the at least one mesa including [*sic*-includes] surfaces oriented along crack planes" as "each such mesa includes at least two surfaces each parallel to some of the crack planes."[14]

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[14] In plaintiff's proposed construction, plaintiff again attempts to use the phrase "2-dimensional loci of points" to refer to a surface. The Court finds that it is unnecessary to use this phrase as it would be more confusing than helpful to the jury, and the Court's construction can simply use the term "surface" instead. In addition, the Court has already rejected plaintiff's proposal to define "crack planes" as "preferential cleavage planes." *See supra* section V.

VII. *at least one mesa comprises a plurality of mesas*

Plaintiff	Defendants
- "at least one mesa" should be construed as "one or more mesas" - "a plurality of mesas" should be construed as "two or more mesas"	Defendants contend that this term is indefinite. If construing this term to preserve the validity of claim 9, which Defendants assert is improper, then "at least one mesa comprises a plurality of mesas" means "the substrate includes more than one upstanding mesa."

This claim term is found in claim 9, which is dependent to independent claim 1. As an initial matter, defendants argue that this term is indefinite because the term is vague. Docket No. 365 at 24-25. In response, plaintiff argues that this term can be construed using the plain and ordinary meanings of the words as they are typically used in claim drafting. Docket No. 362 at 22.

Under 35 U.S.C. § 112, a patent's specification must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as [his or her] invention." 35 U.S.C. § 112 ¶ 2. "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments*, No. 13-369, 2014 U.S. LEXIS 3818, at *6 (June 2, 2014). In *Nautilus*, the Supreme Court explained that indefiniteness under section 112 requires a "'delicate balance.'" *Id.* at *19. "On the one hand, the definiteness requirement must take into account the inherent limitations of language. Some modicum of uncertainty, the Court has recognized, is the 'price of ensuring the appropriate incentives for innovation.'" *Id.* "At the same time, a patent must be precise enough to afford clear notice of what is claimed, thereby '"appris[ing] the public of what is still open to them."' Otherwise there would be '[a] zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.'" *Id.* at *20. Thus, the definiteness requirement "mandates clarity, while recognizing that absolute precision is unattainable." *Id.* at *22. Moreover, indefiniteness must be proven by clear and convincing evidence. *See id. at* *25-26 n.10 (citing *Microsoft Corp. v. i4i Ltd. Partnership*, 131 S. Ct. 2238, 2242 (2011)); *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 723 F.3d 1363, 1368 (Fed. Cir. 2013).

Defendants have failed to provide the Court with any evidence showing that someone skilled

in the relevant art would be unable to ascertain the scope of claim 9 with reasonable certainty. Indeed, defendants fail to state in their brief what precisely would be unclear about the disputed term to a person skilled in the relevant art. Moreover, the term can be readily construed using general principles of claim construction as noted by plaintiff. "The phrase 'at least one' in patent claims typically is construed to mean 'one or more.'" *Biagro Western Sales, Inc. v. Grow More, Inc.*, 423 F.3d 1296, 1304 (Fed. Cir. 2005); *see, e.g.*, *Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 144 (Fed. Cir. 2008) ("The femoral component must include 'at least one condylar element,' which the district court correctly understood to mean 'one or more.'"). Further, the term "plurality" is typically construed to mean "two or more." *See Dayco Prods. v. Total Containment, Inc.*, 258 F.3d 1317, 1327-28 (Fed. Cir. 2001) ("In accordance with standard dictionary definitions, we have held that 'plurality,' when used in a claim, refers to two or more items, absent some indication to the contrary."); *see, e.g.*, *Cheese Sys. v. Tetra Pak Cheese & Powder Sys.*, 725 F.3d 1341, 1348 (Fed. Cir. 2013) ("The district court correctly assessed that a plurality simply means two or more."). Therefore, this phrase should be construed to mean that the one or more mesas from claim 1 must consist of two or more mesas. In other words, this term adds the limitation of requiring at least two mesa as opposed to requiring only one mesa. That this term adds this limitation is sensible in light of the rest of the claim language contained in dependent claim 9. Claim 9 requires in addition to the limitations contained in independent claim 1 that the "at least one mesa comprises a plurality of mesas" and the "plurality of mesas [be] spaced from each other by a distance of less than about 50 microns." '557 Patent at 9:36-38. Therefore, to meet this limitation, the structure would have to contain at least two mesas as opposed to just one, because if the structure contained only one mesa, that mesa could not be spaced less than 50 microns away from another mesa. Accordingly, the Court declines to find that this claim term renders claim 9 of the patent invalid for indefiniteness. In addition, the Court adopts plaintiff's proposed constructions and construes the term "at least one mesa" as "one or more mesas" and the term "a plurality of mesas" as "two or more mesas."

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CONCLUSION

For the foregoing reasons and for good cause shown, the Court adopts the constructions set forth above.

IT IS SO ORDERED.

Dated: June 24, 2014

SUSAN ILLSTON
United States District Judge